

a Insc' Cigarette
a Background of the Invention

The invention is based on the problem of avoiding spotting on the wrappers of cigarettes.

The buyers of cigarettes consider the spotless white appearance of a cigarette as an indication of quality. Even if this opinion is not particularly correct – in hot, humid climates cigarettes can show discoloration even after a short period of storage, which does not affect the smoke flavour – manufacturers have to focus upon market expectations.

Spotting of cigarette paper can be explained in that dissolved substances contained in the tobacco can penetrate the paper at the points of contact between the paper and the tobacco particles, as said paper is both porous and hydrophilic.

It would be conceivable to reduce spotting on cigarette paper in that said paper is coated with any substances that would make the paper completely impervious. Such coatings have been proposed in order to effect rapid extinguishing of discarded cigarettes. In order to be able to control the content of different substances contained in the smoke, however, the cigarette manufacturer is generally interested in a certain degree of air permeability of the cigarette paper. The problem is consequently to, on the one hand, keep the paper permeable for air, and on the other hand to reduce the permeability for dissolved cigarette ingredients.

For solving the problem, US-A 5,143 099 proposed to form the cigarette wrapper using two layers of paper, wherein the inner wrapper is provided with a very high degree of permeability, so that the overall permeability remains sufficient. In this context, the possibility of making the inner wrapper water repellent by adding 0.5% alkyl ketene dimer was mentioned.

Summary of the Invention

In comparison with the prior art described, the object of the invention is to make the

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use of two layers of paper superfluous, this being by means of an impregnating agent that is harmless and changes the smoke flavour as little as possible.

- It was unexpected that providing the cigarette with a wrapper that comprises a layer of
5 paper with water repellent impregnation made from a cellulose derivative, in particular
of ethyl cellulose, would lead to a solution of the object. EP 0 419 981 does describe
such a cigarette, in which, however, the air permeability is below 5 Coresta units.

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The invention is based on the recognition that the impregnation can be sufficiently thin
10 to retain the desired air permeability, if it is applied in several layers. It is thus
provided according to the invention that the cellulose derivative is applied in several
layers in order to obtain an air permeability in the wrapper of at least 20, preferably 50
Coresta units.

15 Different cellulose derivatives per se satisfy the physical criteria required with respect
to air permeability and water permeability in the impregnated paper, for example,
sufficiently highly derived cellulose ether and cellulose ester (for example,
nitrocellulose). Ethyl cellulose is preferred, however, as it is harmless – it complies
with the German regulations – and makes practically no change to the smoke flavour.

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Further details of the invention will be discussed hereinafter with reference to
comparative tests.

25 Cigarette papers with a substance of 26g/m² were coated, in a gravure process by
means of a coating roller, with cellulose azetopropionate (CAP) or with cellulose
azetobutyrate (CAB) or with ethyl cellulose (EC). The amount applied was
approximately 0.7 g/m². Cigarettes were manufactured with the cigarette paper
manufactured in this way.

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In order to test their spotting tendency, the cigarettes were stored packaged and
unpackaged at either 20°C and 60% relative humidity or 30°C and 80% relative

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humidity. Examination for spotting (in each case 100 cigarettes) was carried out immediately after production and after 24 and 48 hours. An evaluation was made according to spot size and number, and the results were converted, by means of weighting, into a point system.

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The evaluation produced the following results:

Coating with 0.7 g EC	572 points
Coating with 0.7 g CAP	223 points
Coating with 0.7 g CAB	77 points

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Although ethyl cellulose coated paper showed a comparatively strong tendency for spotting (large number of spots), the further development was carried out with this material, as an undesired change in the smoke character was determined with CAP and CAB. Even with the use of EC coated paper, a significantly lower spotting frequency was nevertheless determined, compared with uncoated paper. After approximately one month, however, the cigarettes manufactured using paper coated with EC showed no dark spots, whereas large yellow spots appeared on those with uncoated paper. This is probably because coloring agents penetrate the paper through flaws in the coating, the spreading of which agents is prevented by the coating. Due to these observations, the tests were repeated with twice-coated paper, that is to say with cigarette paper loaded with 1.4 g/m^2 . With this, the spotting tendency decreased, according to the method of calculation described hereinabove, to 56 points, that is to say it reduced by the power of 10 compared to the single coating. This excellent result was confirmed in long-term testing.

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It is to be emphasised in particular that the success described was obtained even though the porosity of the paper, which was 50 Coresta units before coating, was still 20 Coresta units after coating. Initial tests with more porous paper as the starting material confirm that even with a final porosity of 50 Coresta units, the radical reduction in the tendency to spot, according to the invention, was obtained. (One Coresta unit (CU) indicates how many cm^2 of air flow per minute through an area of 1 cm^2 of paper under pressure of a 10 cm head of water.)

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